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Operating instrument

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Operating instruments for flushing with special liquids can be equipped with extremely small nozzles in order to achieve tissue severing under high flushing pressure. In order to achieve reliable and hygienically perfect  
10 cleaning, and to be able to quickly restore the functioning in the event of a blockage during the operation, in the invention a tubular plastic part (7) is introduced into the introducing hollow (EÖ) of the pipe-shaped part (1) and fixed and sealed there by means of the closure part (13).  
15 The flushing liquid is supplied at high pressure via a hose (15), which is likewise connected to the closure part (13) with an olive and coupling nut (Fig. 4).

Description

The invention relates to instruments which are flushed with  
5 special liquids, e.g. physiological saline, for open and  
laparoscopic surgery. Such instruments can have extremely  
small nozzles and be employed with the flushing liquid  
under high pressure for tissue severing.

10 Developments of these instruments are known, which by means  
of a high-pressure pump force liquid at a flow rate of up  
to 300 m/sec through a nozzle located at the tip of a metal  
pipe. Pumps of lower capacity have also been used, but  
without achieving tissue severing.

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The known pumps for flushing the field of operation in the  
event of bleeding employ pipe-shaped instrument  
attachments, which can also be closed by valves.

20 However, even at high pressures, this type of flushing does  
not achieve complete clearing of the field of operation and  
is unsuitable for further useful applications.

When using instrument attachments with small nozzles,  
25 however, relatively large particles in the flushing liquid  
may be forced into the nozzle due to the high pressure. It  
is then difficult to clear the passage through the  
instrument during the operation. Also, in terms of hygiene  
standards, the pipe with the required nozzle can only be  
30 inadequately cleaned.

The object of the invention is therefore to provide an  
operating instrument of the above-mentioned type, in which

the outlay on cleaning during the operation is minimised and hygienically perfect processing after the operation is possible.

- 5 This object is achieved by the subject-matter of the invention. A pipe-shaped part of the instrument with an introducing hollow has a sufficiently large inside diameter for hygienic cleaning. At its base, it has an in particular cylindrical, hemispherical or funnel-shaped introducing  
10 opening, which externally has a connecting point, in particular a threaded portion, for a further instrument part. At the tip, the introducing hollow is in particular conical as a mating support for the part to be introduced.
- 15 Furthermore, a second tubular instrument part made of plastic material is present, which part is designed, with respect to its outside diameter and its length, for introduction into the pipe-shaped part. This part also has at its base a disc-shaped or spherical thickened portion  
20 and bears at its tip a nozzle. The base can also be widened in a funnel shape, in order to be securely held in a conical pinch. The plastic part is to be disposed of during the processing of the instrument.
- 25 As a third part there is an in particular screw-on or push-on closure of the pipe-shaped part at one end, which closure at the same time fixes the introduced tube and by means of the latter's terminal disc, sphere or funnel-shaped widening achieves leak-tightness.

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The design with a plurality of parts facilitates the cleaning of the instrument after the operation and enables hygienically perfect processing. The part which is disposed

of consists of a small amount of plastic compared with the conventional disposable instruments. In the event of a blockage of the instrument during the operation, and an unsuccessful attempt at cleaning, the functioning of the instrument can be restored simply by exchanging the internal plastic tube.

For the tubular plastic part there is provided an introducing aid which in particular corresponds to a metal rod with stop, which is introduced into the part. The introducing aid is also used for removal by, in particular, a threaded part or some other clamping means holding the plastic tube and facilitating removal.

The closure part of the pipe, which part also fixes and seals the inner tube, can be firmly connected to the hose supply line for the flushing liquid. For this purpose, it advantageously has a thickened portion, a so-called olive, and a coupling nut. The above-described operating instrument can also be fitted in a conventional flushing and suction instrument, in which case a special valve directs the pressure of the flushing liquid selectively into the thin or thick flushing pipe.

A development of an instrument of the above-mentioned type consists in particular of a thick-walled plastic pipe, which at its base has a conical opening and can be connected there, by in particular a threaded portion, directly to the aforementioned closure part. The tip is formed as a small nozzle. The plastic part can also contain light-guiding fibres in its wall and act as a so-called annular light, in order to advantageously compensate for the loss of brightness in the endoscopic technique due to

blood deposits. For this purpose, the closure part must include devices to couple light-guiding fibres.

The invention is described by way of example below with  
5 reference to schematic drawings, in which

Fig. 1 shows a pipe-shaped part with light-guiding fibres in the wall,

10 Fig. 2 shows a tubular instrument part made of plastic with an internal introducing aid,

Fig. 3 shows a closure part with supply hose for the flushing liquid,

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Fig. 4 shows an exploded drawing of the entire instrument.

Fig. 1 shows the pipe-shaped instrument part 1 having the connecting point 2 for the closure part. The seal  
20 receptacle 3 is put under mechanical pressure by the closure part. In the pipe wall, light-guiding fibres 4 run to the circular light outlet 5. The tip 6 of the introducing hollow EÖ of the pipe-shaped part has a special shape which matches the tip of the tubular part and  
25 prevents deformation of the latter under flushing pressure.

Fig. 2 shows the tubular instrument part 7 having a disc-shaped thickened portion 8 and the nozzle 9. The internal introducing aid 10 has a handle 11 acting as a  
30 stop, and a threaded part 12 for fixing the tubular part 7 upon introduction and removal.

Fig. 3 shows the closure part 13 having the pressing-on point 14 for the sealing disc 8. The hose supply 15 for the flushing is fixed by means of the olive 16 and a coupling nut 17.

## Claims

1. Flushing instrument for surgery having a nozzle, which  
5 instrument is composed of a pipe-shaped part (1), a tubular  
part (7) made of plastic which is guided therein and has  
both a connecting point (8) acting as a seal and a  
nozzle (9), and a closure part (13) for fixing and sealing-  
off the internal plastic tube and coupling the  
10 flushing (15).

2. Flushing instrument according to Claim 1., characterised  
in that the introducing hollow (EÖ) of the pipe-shaped  
part (1) has at its tip (6) a special shape which matches  
15 the tip of the tubular part (7) and prevents deformation of  
the latter under flushing pressure.

3. Flushing instrument according to Claim 1. and 2.,  
characterised in that light-guiding fibres (4) are built  
20 into the wall of the pipe-shaped part (1).

4. Flushing instrument according to Claim 1. to 3.,  
characterised in that a cylindrical part (3) of the pipe-  
shaped part (1) is enlarged relative to the lumen in order  
25 to receive the sealing connecting element (8) of the  
tubular part (7), and is put under mechanical pressure by  
the closure part (13) upon assembly of the instrument.

5. Flushing instrument according to Claim 1. to 4.,  
30 characterised in that a part of the pipe-shaped part (1) is  
conically designed in order to fix the funnel-shaped end of  
the tubular part (7), and in that the closure part is  
likewise conically designed.

6. Flushing instrument according to Claim 1. to 5., characterised in that a metal rod is provided as introducing aid (10) for the tubular part (7).

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7. Flushing instrument according to Claim 6., characterised in that a hand guide (11) and a fixing (12) for the tubular part (7) are provided on the metal rod (10).

10 8. Flushing instrument according to Claim 1. to 7., characterised in that the wall of the tubular part (7) contains light-guiding fibres.

9. Flushing instrument according to Claim 1. to 8.,  
15 characterised in that the sealing connecting element of the tubular part (7) is designed to be spherical or thickened in the shape of a disc or funnel-shaped.

10. Flushing instrument according to Claim 1. to 9.,  
20 characterised in that the closure part (13) has a cylindrical part (14) for pressing on the tube seal (8) and a connecting point for the flushing liquid.

11. Flushing instrument according to Claim 1. to 10.,  
25 characterised in that light-guiding fibres are integrated into the closure part (13) and connecting devices of light-guiding fibres are present.

12. Flushing instrument according to Claim 1. to 11.,  
30 characterised in that the closure element (13) has a conical portion for fixing the tubular part (7).



13. Flushing instrument according to Claim 1. to 12., characterised in that the connecting point for the flushing liquid is designed as a tube clamp with an olive (16) and coupling nut (17).

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14. Flushing instrument according to Claim 1. to 13., characterised in that the fully assembled instrument is part of a larger-lumen flushing and suction instrument and directs the pressurised flushing liquid by a valve  
10 selectively into the desired lumen.

15. Flushing instrument according to Claim 1., characterised in that the pipe-shaped part (1) consists of a thick-walled plastic and at its base has a connecting  
15 point with, in particular, a threaded portion for the closure part (13) and at its tip a nozzle.

16. Flushing instrument according to Claim 15., characterised in that the pipe-shaped part (1) and its  
20 introducing opening (EÖ) are conically widened at the base.

17. Flushing instrument according to Claim 15. to 16., characterised in that the wall contains light-guiding fibres.

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2 page(s) of associated drawings

Translator's notes

The following presumed errors have been corrected in the translation (column and line numbers refer to the German original)

Column 2, line 19: in die das ---> in das

Column, line 27: Helligkeitsversuch ---> Helligkeitsverlust  
(this has been assumed in the translation)

Column 3, line 49: (14) ---> (8)

Column 3, line 55: 12. ---> 11.